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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/662,739	09/15/2003	Yugang Ma	450111-04806	1522
7590 08/02/2007 FROMMER LAWRENCE & HAUG LLP 745 FIFTH AVENUE NEW YORK, NY 10151			EXAMINER FLORES, LEON	
			ART UNIT 2611	PAPER NUMBER
			MAIL DATE 08/02/2007	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

Application No.

10/662,739

Applicant(s)

MA, YUGANG

Examiner

Leon Flores

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 18 January 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 February 2007 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Response to Arguments***

1. Applicant's arguments with respect to claims (1-18) have been considered but are moot in view of the new ground(s) of rejection.

### ***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims (1-18) are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.
4. In claims 1, 3, 10, 12, and 14, the further limitation of "wherein several strong paths are identified, prior to combining the outputs of the correlator branches, using plurality of parallel fingers that are independent of a CDMA demodulator" is not fully disclosed in the specifications.

For the purpose of art consideration on the merits, this limitation will be construed as having support in the specifications.

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5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims (1-18) are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claims 1, 3, 10, 12, and 14, the further limitation of "strong" makes the claims in the present application indefinite. It is not clear to the examiner as to what the applicant is trying to contemplate with this limitation.

For the purpose of art consideration on the merits, this limitation will be construed as having a good signal-to-noise ratio.

### ***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

**9. Claims (1, 7, 14, 17) are rejected under 35 U.S.C. 103(a) as being unpatentable over Koch (US Patent 5,297,171) in view of Miura. (US Patent 6,628,700 B1)**

Re claim 1, Koch discloses a wireless CDMA system in which orthogonal spreading codes are used, a method of reducing multiple access interference caused by a loss of orthogonality between multiple spread spectrum communications signals, the method comprising the steps of: receiving over a multi-path channel the multiple communications signals (See fig. 1: a, b, 5a, 5b); passing the received signals through a plurality of correlation branches (See fig. 1: 6a and 6b) and combining the outputs of the correlator branches to produce a combined signal (See fig. 1: 12); passing the combined output signal through an equalizer (See fig. 1: 3)

But the reference of Koch fails to specifically disclose the equalizer is an adaptive equalizer and demodulating the equaliser output

However, Koch does suggest that the individual receive branches are adjusted to the transmission requirements with the aid of the matching circuits at predetermined time intervals during the equalization. (See col. 3, line 60 – col. 4, line 2) Furthermore, one skilled in the art would know that demodulating the output of the equalizer is well known in the art, and it is mainly used to reduce the effect of jitter as well as to extract the information from the received signal.

Therefore, it would have obvious to one of ordinary skills in the art to have incorporated these features into the system of Koch, for the benefit of optimizing the communication system.

But the reference of Koch fails to specifically teach that wherein several strong paths are identified, prior to combining tile outputs of the correlator branches, using plurality of parallel fingers that are independent of a CDMA demodulator.

However, Miura does. (See abstract, figs. 1A, 1B, col. 1, line 66 – col. 2, line 2, col. 4, lines 27-44) Miura discloses a CDMA system comprised of multiple finger processing units, whereby each finger is capable of selecting the best signal on the basis of measured interference wave levels. Once each permitted signal is estimated, they are combined/synthesized using a RAKE synthesizing unit.

Therefore, taking the combined teachings of Koch and Miura as a whole. It would have been obvious to one of ordinary skills in the art to have incorporated this feature into the system of Koch, in the manner as claimed and as taught by Miura, for the benefit of suppressing the influences of multi-path interference.

Re claim 7, the combination of Koch and Miura further discloses that wherein the equaliser is an adaptive order equaliser whose length is adaptively adjusted. (See col. 3, line 60 – col. 4, line 2. Furthermore, since the individual receive branches a, b are adjusted to the transmission requirements with the aid of the matching circuits at predetermined time intervals during the equalization.)

Claim 14 has been analyzed and rejected w/r to claim 1 above.

Claim 17 has been analyzed and rejected w/r to claim 7 above.

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**10. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Koch (US Patent 5,297,171) and Miura. (US Patent 6,628,700 B1), as applied to claim 1 above, and further in view of Berezdivin et al. (hereinafter Berezdivin) (US Patent 6,847,678)**

Re claim 2, the combination of Koch and Miura further disclose including adapting the equaliser using an adaptive loop. (See claim 1)

But they fail to teach including pilot de-modulation. However, Berezdivin does. (See col. 9, lines 30-33)

Therefore, taking the combined teachings of Koch, Miura, and Berezdivin as a whole. It would have been obvious to one of ordinary skills in the art to have incorporated this feature into the system of Koch, as modified by Miura, in the manner as claimed and as taught by Berezdivin, for the benefit of allowing coherent demodulation as well as to improve power efficiency. (See col. 9, lines 33-34)

**11. Claims (3, 10, 12) are rejected under 35 U.S.C. 103(a) as being unpatentable over Koch (US Patent 5,297,171) in view of Miura (US Patent 6,628,700 B1), and further in view of Sano. (US Patent 6,879,624)**

Re claim 3, Koch disclose a method of reducing multiple access interference between multiple communications signals, the method including the steps of: receiving over a multi-path channel the multiple communications signals (See fig. 1: a, b, 5a, 5b); recovering from the received signals a plurality of signals of interest each of which corresponds with a different one of the paths of the multi-path channel (See fig.1, col. 3,

lines 30-35); estimating a weight for each of the paths of each of the signals recovered in step (ii) (See fig. 1: 11 & 12); passing the combined signal through an equaliser to produce an output (See fig. 1: 3).

But the reference of Koch fails to specifically disclose demodulating the equaliser output

However, one skilled in the art would know that demodulating the output of the equalizer is well known in the art, and it is mainly used to reduce the effect of jitter as well as to extract the information from the received signal.

Therefore, it would have obvious to one of ordinary skills in the art to have incorporated these features into the system of Koch, for the benefit of optimizing the communication system.

But the reference of Koch fails to specifically teach that (vi) after carrying out steps (iv) and (v) on the recovered signals combining the recovered signals to produce a combined signal, wherein several strong paths are identified, prior to combining tile outputs of the correlator branches, using plurality of parallel fingers that are independent of a CDMA demodulator.

However, Miura does. (See abstract, figs. 1A, 1B, col. 1, line 66 – col. 2, line 2, col. 4, lines 27-44) Miura discloses a CDMA system comprised of multiple finger processing units, whereby each finger is capable of selecting the best signal on the basis of measured interference wave levels. Once each permitted signal is estimated, they are combined/synthesized using a RAKE synthesizing unit.



Therefore, taking the combined teachings of Koch and Miura as a whole. It would have been obvious to one of ordinary skills in the art to have incorporated this feature into the system of Koch, in the manner as claimed and as taught by Miura, for the benefit of suppressing the influences of multi-path interference.

The combination of Koch and Miura disclose the limitation as claimed above, except they do not specifically teach offsetting each of the recovered signals by an appropriate delay; applying to each of the recovered signals a scale factor which is the conjugate of the corresponding weight estimated in step (iii).

However, Sano does. (See fig. 4) Sano discloses estimating a weight for each of the paths of each of the signals (see weight controller 123), offsetting each of the signals by an appropriate delay (see 122), applying to each of the signals a scale factor, which is the conjugate of the corresponding weight estimated. (see 124-1 to 124-H)

Furthermore, one skilled in the art would know that delaying the signals prior to combining is obvious b/c the signals need to be time aligned in order to be combined. In addition, applying to each of the signals a scale factor which is the conjugate of the corresponding weight estimated is needed to provide highly accurate path detection corresponding to the signal quality in the path. (See col. 4, lines 1-2)

Therefore, taking the combined teachings of Koch, Miura, and Sano as a whole. It would have been obvious to one of ordinary skills in the art to have incorporated this feature into the system of Koch, as modified by Miura, in the manner as claimed and as taught by Sano, for the benefit of improving the reception quality. (See col. 4, lines 2-3)

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Claim 10 has been analyzed and rejected w/r to claim 3 above.

Claim 12 has been analyzed and rejected w/r to claim 3 above.

**12. Claims (4, 11, 13, 15) are rejected under 35 U.S.C. 103(a) as being unpatentable over Koch (US Patent 5,297,171), Miura (US Patent 6,628,700 B1), and Sano (US Patent 6,879,624), as applied to claim 3 above, and further in view of Berezdivin et al. (hereinafter Berezdivin) (US Patent 6,847,678)**

Re claim 4, the combination of Koch, Miura, and Sano further disclose including adapting the equaliser using an adaptive loop. (See claim 1)

But they fail to teach including pilot de-modulation. However, Berezdivin does. (See col. 9, lines 30-33)

Therefore, taking the combined teachings of Koch, Miura, Sano and Berezdivin as a whole. It would have been obvious to one of ordinary skills in the art to have incorporated this feature into the system of Koch, as modified by Miura and Sano, in the manner as claimed and as taught by Berezdivin, for the benefit of allowing coherent demodulation as well as to improve power efficiency. (See col. 9, lines 33-34)

Claim 11 has been analyzed and rejected w/r to claim 4 above.

Claim 13 has been analyzed and rejected w/r to claim 4 above.

Claim 15 has been analyzed and rejected w/r to claim 4 above.

**13. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Koch (US Patent 5,297,171) and Miura. (US Patent 6,628,700 B1), as applied to claim 1 above, and further in view of Crebouw. (US Patent 5,090,028)**

Re claim 5, the combination of Koch and Miura fails to specifically disclose that wherein a normalisation process is carried out prior to passing the combined signal through the equaliser.

However, Crebouw does. (See fig. 1: 25: normalizing circuit and element 29, equalizer, col. 3, lines 10-12).

Therefore, taking the combined teachings of Koch, Miura, and Crebouw as a whole. It would have been obvious to one of ordinary skills in the art to have incorporated this feature into the system of Koch, as modified by Miura, in the manner as claimed and as taught by Crebouw, for the benefit of performing equalization under the best possible conditions. (See col. 3, lines 12-13)

**14. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Koch (US Patent 5,297,171), Miura. (US Patent 6,628,700 B1), and Crebouw (US Patent 5,090,028), as applied to claim 5 above, and further in view of Jeske et al. (hereinafter Jeske) (US Publication 2002/0176516)**

Re claim 6, the combination of Koch, Miura, and Crebouw fails to specifically disclose that wherein the normalisation process involves taking an exponential weighted or slide window average of the combined signal.

However, Jeske does. (See paragraph 16) Jeske discloses a normalization process, which involves taking an exponential weighted of the combined signal.

Therefore, taking the combined teachings of Koch, Miura, Crebouw, and Jeske as a whole. It would have been obvious to one of ordinary skills in the art to have incorporated this feature into the system of Koch, as modified by Miura and Crebouw, in the manner as claimed and as taught by Jeske, for the benefit of accurately estimate signal-to-interference+noise ratio (SINR) as well as to optimize the performance of communication systems.

**15. Claims (8 & 9) are rejected under 35 U.S.C. 103(a) as being unpatentable over Koch (US Patent 5,297,171) and Miura. (US Patent 6,628,700 B1), as applied to claim 1 above, and further in view of Lai et al. (hereinafter Lai) (US Publication 2006/0126715)**

Re claim 9, the combination of Koch and Miura fails to specifically disclose that wherein the equaliser applies a recursive least square algorithm.

However, Lai does. (See paragraph 51) Furthermore, a recursive least square algorithm is very well known in the art, and they commonly used/applied in equalizer.

Therefore, taking the combined teachings of Koch, Miura, and Lai as a whole. It would have been obvious to one of ordinary skills in the art to have incorporated this feature into the system of Koch, as modified by Miura, in the manner as claimed and as taught by Lai, for the benefit of optimizing the communication system.

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Claim 8 has been analyzed and rejected w/r to claim 9 above. Furthermore, one skilled in the art would know that optimization is achieved by minimizing the mean square error, and this is commonly when updating the coefficients in the equalizer.

**16. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Koch (US Patent 5,297,171), Miura (US Patent 6,628,700 B1), and Sano (US Patent 6,879,624), as applied to claim 3 above, and further in view of Crebouw. (US Patent 5,090,028)**

Re claim 16, the combination of Koch and Miura fails to specifically disclose that wherein a normalisation process is carried out prior to passing the combined signal through the equaliser.

However, Crebouw does. (See fig. 1: 25: normalizing circuit and element 29, equalizer, col. 3, lines 10-12).

Therefore, taking the combined teachings of Koch, Miura, Sano and Crebouw as a whole. It would have been obvious to one of ordinary skills in the art to have incorporated this feature into the system of Koch, as modified by Miura and Sano, in the manner as claimed and as taught by Crebouw, for the benefit of performing equalization under the best possible conditions. (See col. 3, lines 12-13)

**17. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Koch (US Patent 5,297,171), Miura (US Patent 6,628,700 B1), and Sano (US Patent**

**6,879,624), as applied to claim 3 above, and further in view of Lai et al.  
(hereinafter Lai) (US Publication 2006/0126715)**

Re claim 18, the combination of Koch, Miura, and Sano fails to specifically disclose that wherein the equaliser applies a recursive least square algorithm.

However, Lai does. (See paragraph 51) Furthermore, a recursive least square algorithm is very well known in the art, and they commonly used/applied in equalizer.

Therefore, taking the combined teachings of Koch, Miura, Sano, and Lai as a whole. It would have been obvious to one of ordinary skills in the art to have incorporated this feature into the system of Koch, as modified by Miura and Sano, in the manner as claimed and as taught by Lai, for the benefit of optimizing the communication system.

### ***Conclusion***

18. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

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the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.


### **Contact**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leon Flores whose telephone number is 571-270-1201. The examiner can normally be reached on Mon-Fri 7-5pm Alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Payne can be reached on 571-272-3024. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

LF  
July 24, 2007

  
DAVID C. PAYNE  
SUPERVISORY PATENT EXAMINER